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(19) (CA) **CANADIAN PATENT** (12)

(54) Home Bathing Unit

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BACKGROUND OF THE INVENTION

The present invention relates to bathing devices,  
and in particular to a bathing unit specifically designed  
for home use.

Bathing units for invalids confined to hospitals,  
nursing homes, convalescent and retirement centers, and  
other similar institutions are presently available, and  
generally comprise a bathtub with some type of lifting  
device to transfer the patient from a wheelchair or gurney  
into the bathtub.

A novel apparatus and method for bathing invalids  
is disclosed in our prior United States Patent Nos.  
4,346,485; 4,446,586; 4,365,367; 4,399,569; and  
4,439,877. This apparatus includes a lateral access  
opening in one side of the bathtub to facilitate  
transferring the invalid into and out of the bathtub, and  
a vertically sliding door to selectively close the access  
opening. The bathing unit is particularly adapted for  
bathing invalids, and others with impaired ambulatory  
ability, and requires the aid of an assistant or  
attendant. The door lock is a manually operated,  
mechanical device that is operated from outside of the  
bathtub by an assistant. Also, the control panel for the



1 water controller is located at the foot end of the  
bathtub, away from the seat area, so that the controls are  
designed to be manipulated only by an assistant. The  
bathing unit has a special toe space, and a notch in the  
5 door which make it easier for the assistant to reach into  
the bathtub to bathe the invalid. Furthermore, the  
bathtub seat is at the level of a conventional wheelchair,  
and one side of the seat is fully open, so that the  
assistant can shift the patient between the bathtub and a  
10 wheelchair with a natural, unstrained swinging motion,  
which permits the attendant to keep his feet fixed on the  
floor, and maintain the weight of the invalid close to his  
body to minimize muscle strain. The bathtub door can be  
raised to a fully overhead position, so that it is not in  
15 the way when the assistant transfers the patient between  
the bathtub and the wheelchair. All of these features  
assist the attendant in providing complete and thorough  
bathing of the invalid, while minimizing strain and effort  
on his part.

20 The present bathing unit is particularly designed  
for home use, and does not require the help of an  
attendant, or other assistant. The bather can operate the  
bathing unit by himself from a seated position within the  
bathtub. The unit provides heated, whirlpool bathing,  
25 which is becoming increasingly popular among people of all  
ages. The unit can also provide hydrotherapy, which is  
particularly useful for minor muscle aches, and other  
self-health care, as well as for the elderly. Since the  
services of an attendant are not required to bathe in the  
30 present unit, the bather can maintain privacy, if the  
bather so desires.

SUMMARY OF THE INVENTION

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One aspect of the present invention is a home bathing unit, comprising a bathtub having opposite sidewalls and end walls, with an access opening in one of the sidewalls for ingress and egress therethrough. A seat is located in the bathtub adjacent to one of the end walls, and a door selectively closes the access opening. A mechanism is provided for vertically guiding the door between a fully open position wherein bather movement through the access opening is permitted, and a fully closed position wherein the door sealingly closes the access opening. The door has a lock mechanism to securely lock the door in the fully closed position. A lock actuator is operably connected with the lock, and is positioned to be manipulated by a bather disposed on the seat of the bathtub. A handle is located on the door at a position from which a bather disposed on the seat of the bathtub can grasp the handle to manually translate the door between the fully open and fully closed positions. A door controller is provided, having a mechanism for retaining the door in the fully open position until moved therefrom by the bather. A device is also provided for adjusting the height of the door in the fully open position, so that the door is high enough to permit the bather to readily enter the bathing unit through the access opening without any interference, yet low enough to permit the bather, when disposed on the seat of the bathtub, to reach the handle on the door to manipulate the same. In this manner, the bather may enter and exit the bathing unit, and open, close, and lock the door by himself from a seated position within the bathtub, without

1 requiring an assistant.

A spring loaded counterbalance may be connected with the door to resiliently retain the same in the fully open position. The counterbalance includes a device for  
 5 adjusting spring tension, and an adjustable stop may be provided to positively locate the door in the selected fully open position.

Another aspect of the present invention is a combination door guide and grab bar arrangement for  
 10 bathing units of the type having a bathtub with an access opening in one side, and a vertically translating door to selectively close the opening. The combination door guide and grab bar arrangement comprises a pair of upright support posts positioned adjacent opposite side edges of  
 15 the door, which are oriented in a mutually parallel and generally vertical relationship. Guides are mounted on the opposite side edges of the door, and are telescopingly received over the support posts for sliding translation therealong. The support posts both guide the door between  
 20 the open and closed positions, and provide vertical grab bars along the sides of the access opening to facilitate ingress and egress, without interfering with the operation of the door.

The support posts are preferably cylindrical,  
 25 with an inverted L-shape in side elevation, and the guides are pivotally mounted on the door, so that the door may assume an overhead storage position. The inverted L-shape posts may have a support bracket for additional rigidity, and the guides have a mating slot through which the rod  
 30 support brackets pass as the door is translated.

1 Yet another aspect of the present invention is an  
adjustable control console for bathing units of the type  
having a bathtub with at least one water dispenser, a seat  
area at one end of the bathtub, and a controller located  
5 at the other end of the bathtub to adjust the water  
dispenser. The adjustable console comprises a cabinet  
having a chassis, and a front plate facing the one end of  
the bathtub. The controller is mounted in the chassis,  
and includes a variable actuator portion which extends  
10 through the front plate of the cabinet, and is accessible  
to a user disposed in the seat area of the bathtub. A  
console support is connected with the bathtub, and  
slidingly mounts the cabinet at the other end of the  
bathtub for selective movement along a generally  
15 horizontal plane. A connector non-rigidly communicates  
the controller with a source of pressurized water, whereby  
the console is bodily translated along the support to  
adjust the fore-to-aft position of the console with  
respect to the seat area of the bathtub for a particular  
20 user, such that variously sized users can readily grasp  
and manipulate the actuator portion of the controller.

The adjustable control console preferably  
includes a handle which can be grasped by a seated user,  
so that the user may himself adjust the position of the  
25 console, without requiring an assistant. Furthermore, the  
console support preferably comprises a combination support  
and grab bar arrangement that facilitates entering and  
exiting the bathtub.

Yet another aspect of the present invention is a  
30 power door lock for bathing units of the type having a  
bathtub with an access opening, and a vertically

1 translating door. The access opening has a wedge-shaped  
contour which mates with a similarly shaped sealing edge  
of the door. A compression seal is positioned between the  
lip portion of the bathtub and the sealing edge of the  
5 door to form a watertight seal therebetween. The power  
door lock comprises a lock pin connected with the door,  
which protrudes outwardly from the lower edge thereof. A  
latch arm is connected with the bathtub, and is shaped to  
matingly engage the lock pin when the door is in an  
10 initial, closed position. A power actuator mechanically  
moves the latch arm laterally into engagement with the  
lock pin, and thence moves the latch arm longitudinally,  
and pulls the lock pin and the door downwardly until the  
compression seal is seated securely between the lip of the  
15 bathtub and the sealing edge of the door to form a  
watertight seal therebetween.

Preferably, the power actuator comprises a  
hydraulic ram which operates from the water pressure  
available in the bathing unit. The door may have a spring  
20 loaded counterbalance which normally retains the door in a  
fully open position, and a snap lock to selectively retain  
the door in an initial, closed position in which the lock  
pin is aligned with the mating latch arm to insure proper  
engagement. The length of the lock pin may be adjustable  
25 to vary pressure on the compression seal, and a cam slide  
linkage may be used to shift the latch arm laterally and  
longitudinally.

The principal objects of the present invention  
are to provide a bathing unit that has total bathing and  
30 whirlpool for standard hygiene as well as hydrotherapy,  
and can be operated solely by the bather from within the

1 bathtub, without the need for an assistant. The height of  
the door in the fully open position can be easily adjusted  
for a particular bather, so that the door is high enough  
that the bather can readily enter and exit the tub without  
5 bumping his head, yet is low enough that when the bather,  
when seated within the bathtub, can readily reach the door  
and manually raise and lower the same. A combination door  
guide and vertical grab bar arrangement makes it possible  
for even elderly or infirm bathers to easily raise and  
10 lower the door by themselves, and to safely enter and exit  
the bathing unit. An adjustable control console is  
slidingly supported on horizontal rods, so that the seated  
user can pull the entire console toward him for  
convenience during use, and then push the console back to  
15 a retracted, storage position to facilitate the user's  
unobstructed entry and exit from the bathing unit.  
Preferably, all of the controls for the bathtub, including  
mixer temperature control, drain control, flow control,  
whirlpool and areator controls, as well as the door lock  
20 controller are mounted on the adjustable console. A  
powered door lock is provided to securely lock the door in  
the closed and sealed position, without requiring any  
substantial manual effort on the part of the user. The  
bathing unit is efficient in use, capable of a long  
25 operating life, and particularly well adapted for home use.

These and other features, advantages, and objects  
of the present invention will be further understood and  
appreciated by those skilled in the art by reference to  
the following specification, claims, and appended drawings.



BRIEF DESCRIPTION OF THE DRAWINGS

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Fig. 1 is a front elevational view of a bathing unit embodying the present invention, with the door shown in an open position.

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Fig. 2 is a perspective view of an adjustable control console portion of the bathing unit.

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Fig. 3 is a fragmentary, front elevational view of the bathing unit, particularly showing a combination door guide and grab bar arrangement, with the door shown in a closed position.

Fig. 4 is a fragmentary, side elevational view of the bathing unit shown in Fig. 3, wherein the door is also shown in the closed position.

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Fig. 5 is a top plan view of an upper door guide portion of the bathing unit.

Fig. 6 is a top plan view of a lower door guide portion of the bathing unit.

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Fig. 7 is a fragmentary, rear elevational view of the bathing unit, particularly showing a counterbalance spring arrangement for the door.

Fig. 8 is a fragmentary, partially schematic, top plan view of the bathing unit, with the door shown in the open position.

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Fig. 9 is a fragmentary, partially schematic, side elevational view of that portion of the bathing unit illustrated in Fig. 8, with the door shown in the same, open position.

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Fig. 10 is a fragmentary, top plan view of the bathing unit, particularly showing the adjustable control console, which is illustrated in an outwardly extended position.

1           Fig. 11 is a fragmentary, top plan view of the  
bathing unit shown in Fig. 10, with the adjustable control  
console shown in a retracted, storage position.

5           Fig. 12 is a fragmentary, vertical  
cross-sectional view of the bathing unit, particularly  
showing a power door lock, wherein the door is shown in a  
partially open position.

10          Fig. 13 is a fragmentary, vertical  
cross-sectional view of the bathing unit and power door  
lock, wherein the door is shown in an initial, closed  
position.

15          Fig. 14 is a vertical cross-sectional view of the  
bathing unit and the power door lock, wherein the door is  
shown in the initial closed position, and a latch arm  
portion of the lock is engaged with the door.

          Fig. 15 is a vertical cross-sectional view of the  
bathing unit and the power door lock, wherein the door is  
shown in a fully closed and sealed position.

20          Fig. 16 is a front elevational view of the  
bathing unit, wherein a bather is shown seated in a  
bathtub portion of the bathing unit.

          Fig. 17 is a front elevational view of the  
bathing unit, wherein a bather is shown seated in the  
bathtub, and grasping the door to lower the same.

25          Fig. 18 is a front elevational view of the  
bathing unit, wherein the bather is shown seated within  
the bathtub, with the door fully closed.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

30          For purposes of description herein, the  
terms "upper," "lower," "right," "left," "rear," "front,"  
"vertical," "horizontal," and derivatives thereof shall

1 relate to the invention as oriented in Fig. 1, and in  
relation to a seated bather. However, it is to be  
understood that the invention may assume various  
alternative orientations, except where expressly specified  
5 to the contrary.

The reference numeral 1 (Fig. 1) generally  
designates a bathing unit, which is particularly designed  
for home use, and embodies the present invention. Bathing  
unit 1 includes a bathtub 2 with an access opening 3 in  
10 one side for ingress and egress, and a vertically sliding  
door 4 to selectively close access opening 3. Bathing  
unit 1 has a unique, combination door guide and grab bar  
arrangement 5, an adjustable control console 6, and a  
power door lock 7, all of which permit the bather to  
15 easily operate door 4 by himself and to adjust the water  
temperature, flow and whirlpool from a seated position  
within bathtub 2. The bather may thereby receive a total  
bathing and whirlpool experience in private, without the  
need for an assistant. The combination door guide and  
20 grab bar arrangement 5 includes a pair of support rods 8  
and 9 located on either side of the access opening 3,  
which act both as a track on which door 4 smoothly and  
easily glides, and also as vertical grab bars which  
greatly facilitate safely entering and exiting the  
25 bathtub, without interfering with the operation of door  
4. Adjustable control console 6 allows the seated bather  
to move the water controls to a convenient location within  
easy reach for bathing, and then retract the console to an  
out of the way storage position to facilitate entering and  
30 exiting the bathtub. The power door lock 7 securely  
closes door 4 to a fully closed and sealed position

1 without significant manual effort, and includes a remote  
actuator 10 (Fig. 2) located on control console 6 to  
facilitate use of bathing unit 1 without an attendant.

Bathing unit 1 (Fig. 1) generally comprises a  
5 three-sided enclosure, including a rear wall 15, and left-  
and right-hand end walls 16 and 17, respectively. Bathtub  
2 is disposed within enclosure walls 15-17, and preferably  
comprises a seat 18 having an anatomical contour. Seat 18  
has a seat portion 19 disposed at an elevation  
10 substantially commensurate with conventional chair height,  
a back portion 20, and a footwell 21. Preferably,  
enclosure walls 15-17 and seat 18 are integrally molded in  
one piece from a durable, rigid, non-corroding material,  
such as fiberglass or the like. Seat portion 19 is  
15 inclined slightly to the rear, and includes a U-shaped  
trough or channel 22 disposed in the medial portion of the  
seat, and oriented longitudinally therein. Trough 22  
extends from the middle of seat portion 19, and is  
anatomically shaped and positioned to expose the perineal  
20 area of a bather sitting on seat 18. The forward edge of  
seat portion 19 is rounded, and the rearward edge is  
arcuately shaped and blends smoothly with the back portion  
20. Seat 18 includes lateral sidewalls 23 which extend  
upwardly from seat portion 19, and include ledges 24 which  
25 form armrests for the bather. Footwell 21 includes a  
drain 25 (Fig. 10) with a conventional shutoff valve.

Bathtub 2 (Fig. 2) has a front wall 26 which is  
oriented generally vertically, and includes a central  
notch 27 in which adjustable control console 6 is received  
30 in a retracted, storage position. The front wall 26 of  
bathtub 2 tapers inwardly and downwardly to the base of

1 footwell 21. A ledge 28 is formed around the upper edge  
or rim of bathtub 2, and a forward side panel 29 (Fig. 1)  
extends from the floor upwardly to access opening 3.

5 In the illustrated bathing unit 1, access opening  
3 is oriented laterally, and is defined by a lip 40 (Fig.  
1), having an upwardly opening, wedge-shaped contour.  
Door 4 includes a wedge-shaped sealing edge 41 (Fig. 12)  
on the interior side thereof, which conforms to the  
contour of lip 40. A compression seal 42 is positioned  
10 between the lip 40 on bathtub 2, and the sealing edge 41  
of door 4, such that when door 4 is fully closed, as shown  
in Fig. 15, seal 42 is compressed to form a watertight  
seal therebetween. Lip 40 and sealing edge 41 preferably  
have a generally arcuate front elevational shape, as best  
15 illustrated in Figs. 1 and 16-17. In the illustrated  
example, lip 40 and sealing edge 41 have a nearly  
semicircular, front-elevational shape to facilitate  
substantially uniform compression of seal 42 about the  
sealing edge of door 4.

20 Door 4 (Figs. 3 and 4) has a generally  
rectangular shape, and includes a front panel 48, an  
interior panel 49, opposite side edges 50, and upper and  
lower edges 51 and 52, respectively. The right-hand  
portion of bathtub 2 is integrally molded on the interior  
25 panel 49 of door 4, so that when door 4 is open, the  
right-hand side of seat 18 is fully open and exposed to  
facilitate entering and exiting bathtub 2. The front  
panel 48 of door 4 has an opening therein to access the  
interior of door 4 to adjust power door lock 7, and for  
30 other purposes to be described hereinafter. A removable  
cover 53 is detachably mounted over the access opening in

1 door 4 by suitable means, such as threaded fasteners, or  
the like. In this example, removable cover panel 53 (Fig.  
1) includes a recess 54 with a towel rack 55 mounted  
therein. An elongated, cylindrical grab handle 56 is  
5 attached to the lower edge 52 of door 4, and protrudes  
outwardly therefrom to facilitate grasping the door and  
manually manipulating the same between the open and closed  
positions.

The combination door guide and grab bar  
10 arrangement 5 is best illustrated in Figs. 1-9. Support  
posts 8 and 9 are mounted in bathing unit 1 adjacent the  
opposite side edges 50 of door 4, and extend in a mutually  
parallel, and generally vertical orientation. In the  
illustrated example, support posts 8 and 9 (Figs. 8 and 9)  
15 are cylindrical, and have an inverted L-shape in side  
elevation, comprising a straight vertical leg 60, a  
straight horizontal leg 61, and a curved intermediate  
portion 62. The lower ends of support rods 8 and 9 are  
fixedly mounted in the base of bathing unit 1. The upper  
20 ends of support rods 8 and 9 are fixedly mounted in the  
rearwall 15 of bathing unit 1. As shown in Fig. 8,  
support braces 63 are attached to support rods 8 and 9  
near the forward ends of horizontal legs 61. Braces 63  
are generally T-shaped and include a flat, laterally  
25 extending plate 64, and a base plate 65 which is fastened  
to the enclosure end walls 16 and 17 by fasteners 66.  
Braces 63 provide support posts 8 and 9 with lateral  
rigidity so that the support rods will remain accurately  
aligned, and door 40 will glide smoothly between the open  
30 and closed positions. Support rods 8 and 9 preferably  
have a smooth exterior surface, and are constructed of a

1       very durable, water resistant material, such as chrome  
plated tubing, or the like.

      As best illustrated in Fig. 16, the vertical legs  
60 of support rods 8 and 9 are completely open or  
5       freestanding, so that they function as vertical handles or  
grab bars. The vertical rod legs 60 are spaced outwardly  
from enclosure end walls 16 and 17, as well as front panel  
29, so that the bather's hand can easily grasp the rods at  
any location along their length. Braces 63 insure that  
10       the vertical rod legs 60 are sufficiently rigid to  
function as grab bars, and are located at the top of the  
unit, so that they do not interfere with the bather's grip  
on the rods. When door 4 is open, the vertical rod legs  
60 are located immediately adjacent to the sides of access  
15       opening 3, so that they are handy to grasp as the bather  
enters and exits bathing unit 1. Heretofore, it has not  
been possible to position grab bars at a convenient  
location near the access opening 3, because they obstruct  
or interfere with the operation of door 4. In the present  
20       invention, the vertical rod legs 60 not only do not  
interfere with the operation of door 4, but they actually  
function as an integral part of the door guide mechanism.

      Two pairs of guides 70 and 71 (Figs. 3 and 4) are  
mounted on the opposite side edges 50 of door 4, and are  
25       telescopingly received over support rods 8 and 9 for  
sliding translation therealong. Preferably, at least the  
upper pair of guides 70 are pivotal with respect to door  
4, so that the door may assume an overhead storage  
position, as illustrated in Fig. 1. In the illustrated  
30       bathing unit 1, both pairs of guides 70 and 71 are  
pivotally mounted in door 4, to assure smooth operation,

1 and so that door 4 can assume a fully overhead storage  
position if the same is desired.

5 With reference to Fig. 6, the lower guides 71  
comprise a hollow, cylindrical housing 72 with a mounting  
pin 73 fixedly attached to housing 72, and extending  
radially outwardly therefrom. An annularly shaped,  
antifriction insert 74 is mounted within housing 72, and  
is sized to be closely received over an associated one of  
the support rods 8 and 9. Insert 74 may be constructed of  
10 a suitable self-lubricating material, such as nylon, or  
the like.

The upper guides 70 (Fig. 5) are substantially  
similar in construction to the lower guides 71, and  
include a hollow, cylindrical housing 77, a mounting pin  
15 78 connected with housing 77, and an antifriction insert  
79. The upper guides 70 include a slot 80 through the  
housing 77 and insert 79 at a location diametrically  
opposed from pin 78. Slot 80 is slightly larger in width  
than the thickness of the brace plate 64 on the support  
20 rod braces 63, so that the upper guides 70 can pass over  
the support rod braces 63 when the door is raised to an  
overhead storage position.

As best illustrated in Fig. 3, a pair of  
self-lubricating bushings 84 are mounted in the side edges  
25 50 of door 4 adjacent the upper edge 51 of the door.  
Bushings 84 include a central aperture in which in the  
mounting pins 73 of the upper guides 70 are closely  
received to rotatably mount the guides 70 with respect to  
door 4. A second pair of antifriction bushings 85 are  
30 mounted in the side edges of door 4 adjacent the lower  
edge 52 thereof. Bushings 85 also include central



1       apertures in which the pins 78 of the lower guides 71 are  
received to rotatably mount guides 71 therein. Coil  
springs 86 are positioned over the mounting pins 73 and 78  
of the upper and lower guides 70 and 71 between the  
5       associated housing and bushings 77 & 84 and 72 & 85,  
respectively, and urge the sides of door 4 inwardly, so  
that door 4 "floats" laterally on guides 70 and 71. This  
floating action provides smooth, non-binding translation  
of the door, and also self-aligns the sealing edge 41 of  
10       door 4 with the mating lip 40 of bathtub 2.

      With reference to Fig. 7, a spring loaded  
counterbalance mechanism 88 is provided to resiliently  
retain door 4 in a normally open position. Counterbalance  
88 is mounted within the interior of bathtub 2, and  
15       includes an elongate axle 89 rotatably mounted along the  
rearward edge of bathtub 2. A pair of take-up drums 90  
are attached to the opposite ends of axle 89, and a coil  
spring 91 is positioned over a medial portion of axle 89.  
One end of spring 91 is held stationary by a bracket 92,  
20       and the opposite end of spring 91 is connected to axle 98  
by an adjustable collar 93. Rotation of collar 93 with  
respect to axle 89 varies the rotational torque applied to  
the pick-up drums 90 by spring 91.

      Flexible lines 96 are connected to and wrapped  
25       around both take-up drums 90. Flexible lines 96 extend  
from take-up drums 90, through the interior of bathing  
unit 1, to pulleys 97 (Fig. 1) mounted in the upper,  
forward portions of enclosure walls 16 and 17. Brackets  
98 (Figs. 8 and 9) are attached to the rear panel 49 of  
30       door 4, adjacent the lower guides 71. Brackets 98 extend  
laterally outwardly from the side edges 50 of door 4, and

1 swivel eyelets 99 rotatably attach the ends of flexible  
lines 96 to brackets 98. As door 4 is moved downwardly  
toward the closed position, the pulling force is  
transmitted to flexible lines 96, which in turn rotates  
5 take-up drum 90, and tenses spring 91. When door 4 is  
released, the rotational torque stored in spring 91 tenses  
flexible lines 98, and pulls door 4 upwardly to the  
normally open position illustrated in Figs. 1, 8 and 9.

The fully open position of door 4 is preferably  
10 adjustable to accommodate the particular individual or  
individuals using bathing unit 1. In the fully open  
position, door 4 should be sufficiently high to permit the  
user to readily enter bathing unit 1 through access  
opening 3, without bumping his head, as shown in Fig. 16.  
15 Yet, door 4 should be low enough in the fully open  
position to permit the user seated on seat 18 to readily  
reach and grasp handle 56, as shown in Fig. 17, so as to  
pull door 4 closed.

The fully open position of door 4 can be adjusted  
20 by simply varying the tension applied to door 4 by  
counterbalance 88. This adjustment can be achieved by  
either rotating adjustable collar 93, or by varying the  
effective length of flexible lines 96 by repositioning the  
same on take-up drums 90.

25 A positive stop 102 (Figs. 8 and 9) may be  
provided to positively maintain door 4 in a preselected,  
fully open position. In general, stop 102 comprises a  
device, such as a clamp, split sleeve, or the like, which  
is positioned to cause abutment between door 4 and a  
30 stationary portion of bathing unit 1 to prevent door 4  
from opening further. The illustrated stop 102 comprises

1 a hollow cylindrical sleeve, which is closely received  
over support 9. A set screw 102 is threadedly engaged in  
the sidewall of stop 102, and abuts the exterior surface  
of support rod 9 to detachably lock stop 102 in a  
5 particular position. In the example illustrated in Figs.  
8 and 9, stop 102 is positioned on the medial portion of  
the horizontal leg 61 of support rods. Preferably, an  
identical stop 102 is positioned on the horizontal leg of  
the opposite support rod 8. Counterbalance 88 is adjusted  
10 so as to apply light tension to flexible lines 96 when  
door 4 is in the positively stopped, fully open position,  
such that door 4 will automatically return to the desired  
location through the force of spring 91.

The adjustable control console 6 is best  
15 illustrated in Figs. 2, 10 and 11. Control console 6  
comprises a cabinet 106 (Figs. 10 and 11) having a chassis  
107, and a front plate 108. A plurality of controllers  
109 are mounted in cabinet 106, and include actuator  
levers 110, which extend through front plate 108, and are  
20 accessible to a bather positioned on seat 18. In the  
illustrated example, adjustable console 6 includes a  
hot/cold water mixer valve 111, a tub-fill valve 113, a  
shower valve 114, the door lock actuator 10, a bowden  
cable controller 115 for drain valve 25, and a water  
25 temperature indicator 112 (Fig. 2). Adjustable console 6  
also includes a whirlpool controller 116, and an aerator  
controller 117, which extend through front plate 108. A  
tub fill spout 118 is connected with a lower, rear  
portion of the console chassis 107, and is oriented  
30 toward the left-hand sideall 22 of bathtub 2 to alleviate  
splashing. Each of the individual water controllers

1 111-117, as well as tub fill spout 118, and door  
controller 10 is non-fixedly connected with their  
associated actuator by means such as flexible plumbing  
lines, bowden cables, and the like, so that console 6 can  
5 be translated fore-to-aft in bathtub 2, without  
interfering with the controls. For example, tub-fill  
valve 113, and shower valve 114 are in the nature of ball  
valves, and together with mixer valve 111 are communicated  
with sources of pressurized hot and cold water through  
10 flexible plumbing line 119 (Fig. 10). A bowden cable 120  
connects controller 115 with the drain valve 25. As  
described in greater detail hereinafter, door lock valve  
10 is in the nature of a ball valve, and controls the  
communication of water pressure to a door lock actuator  
15 through a flexible plumbing line 121. All of the actuator  
lines, including lines 116, 117 and 118 extend from the  
rear of cabinet 106, through an aperture 122 in the front  
wall 26 of bathtub 2. An arcuately shaped tube or hood  
123 encircles aperture 122, to insure that lines 119, 120  
20 and 121 do not bind as console 6 is moved during  
adjustment.

Controllers 113, 114, 115 and 10 are all lever  
operated, and are shifted between the open and closed  
positions by a vertical motion. This type of control  
25 action permits the controller to be adjusted by bathers  
that have limited dexterity in their fingers, such as  
patients with arthritis, and the like, since it is not  
necessary to grasp the controller in order to adjust it.

A pair of hollow guides 124 and 125 are mounted  
30 on the opposite sides of cabinet 106, and are adapted to  
slidingly support console 6 for translation along a

1 substantially horizontal plane. Guides 124 and 125  
preferably include antifriction bushings, such as nylon  
sleeves, or the like (not shown) to help console 6 slide  
smoothly. A handle 126 (Fig. 2) is attached to the lower,  
5 forward portion of cabinet 106, and is adapted to be  
grasped by a bather seated on seat 18 to facilitate  
adjustment of console 6, without requiring an assistant.

The support device for console 6 preferably  
comprises a combination support and grab bar arrangement  
10 130 (Figs. 10 and 11), having left- and right-hand support  
posts 131 and 132, respectively. The right-hand support  
post 131 is mounted in the front wall 26 of bathtub 2 at  
the right-hand side thereof, adjacent lip 40. The  
right-hand support post 131 comprises a straight,  
15 horizontally oriented upper leg 133, with the free end  
securely mounted in front wall 26. The right-hand guide  
125 on console cabinet 106 is closely received over the  
upper leg 133 of support post 131 for sliding translation  
therealong. Support post 131 also includes an inclined  
20 lower leg 134 (Figs. 1 and 2), which has its free end  
securely mounted in front wall 26 at a location near lip  
40, and below upper leg 133. The right-hand support post  
131 includes an arcuately shaped intermediate portion 135,  
which interconnects the upper and lower legs 133 and 134,  
25 and forms a grab handle which protrudes outwardly toward  
the seat 18 of bathtub 2.

The left-hand support post 132 (Figs. 10 and 11)  
also includes a straight, horizontally oriented upper leg  
138, having a free end mounted securely in front wall 26,  
30 at a location adjacent the rear wall 15. The left-hand  
guide 124 of cabinet 106 is telescopingly received over

1 the upper leg 138 of support post 132, and slidably  
supports console 6 for translation therealong. The  
left-hand support post 132 also includes a straight,  
downwardly inclined lower leg 139, with one end mounted in  
5 the left-hand sidewall 23 of bathtub 2, adjacent the  
left-hand armrest ledge 24. An arcuately shaped  
intermediate section 140 of support post 132 interconnects  
the upper and lower legs 138 and 139 respectively. A  
lateral support rod 141 has one end connected with the  
10 outer end of upper leg 138, and the other end fixedly  
mounted in the rear wall 15 of bathing unit 1. The lower  
leg 139 of left-hand support post 132 forms an elongate  
handle which a bather seated on seat 18 may easily grasp  
with his left hand.

15 Adjustable control console 6 glides horizontally  
on support posts 131 and 132 to adjust its fore-to-aft  
position within bathtub 2, particularly with respect to  
seat 18. The cabinet 106 of console 6 is shaped to be  
received in a mating notch 27 in the front wall 26 of  
20 bathtub 2 when the console is in a retracted, storage  
position, as shown in Fig. 11. This permits the bather to  
enter and exit bathtub 2 without any obstructions. The  
seated bather may pull adjustable control console 6  
outwardly from the retracted, storage position to a  
25 convenient operating position, as shown in Fig. 10.

A "telephone" type shower head or wand 144 (Fig.  
1) is mounted on the rear wall 15 of bathing unit 1 by a  
vertical bracket 145. A flexible tube 146 connects shower  
head 144 with a source of pressurized water through  
30 controller valve 114 on adjustable console 6.

1           As best illustrated in Figs. 12-15, door lock 7  
comprises a lock pin 150, which is connected with door 4,  
and projects outwardly from the lower edge 52 thereof. A  
latch arm 151 is connected with bathtub 2 at a lower,  
5       forward portion thereof, and is shaped to matingly engage  
with lock pin 150 when door 4 is in an initial closed  
position, as shown in Fig. 13. A cam slide linkage 152,  
powered by a hydraulic cylinder or jack 153 moves latch  
arm 151 laterally out into engagement with lock pin 150,  
10       and pulls lock pin 150 and door 4 downwardly until  
compression seal 42 is securely seated between the lip 40  
of bathtub 2 and the sealing edge 41 of door 4, as shown  
in Fig. 15.

          The only portion of power door lock 7 contained  
15       within door 4 is lock pin 150, and its associated mounting  
arrangement. Hence, the door 4 itself does not carry any  
linkage or mechanical lock, as contemplated by the in-door  
lock arrangements for institutional bathing units, as  
disclosed in our prior U.S. Patent Nos. 4,346,485;  
20       4,446,586 and 4,399,569. Furthermore, door 4 does not  
contain any plumbing for spray nozzles, or the like, as  
disclosed in our prior U.S. Patent No. 4,439,877. The  
overall weight of door 4 is thereby reduced to a minimum,  
so that the effort required to raise and lower door 4 is  
25       reduced accordingly to adapt the bathing unit 1 for  
unassisted, home use.

          Lock pin 150 comprises a cylindrically-shaped  
rod, having a elongate, annular slot or groove 156  
adjacent the free end of lock pin 150, so as to define  
30       shank and head portions 157 and 158 respectively of lock  
pin 150. An arcuately shaped annular groove 159 is

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1 provided in lock pin 150 at a location spaced upwardly  
from slot 156, to form one-half of a snap-lock, which is  
described in greater detail hereinafter.

5 The upper end 160 of lock pin 150 is threaded,  
and is mounted within the interior of door 4, through  
sealing edge 41, near the vertical center line of door 4.  
Lock pin 150 is preferably mounted in door 4 so that its  
effective length can be adjusted to vary the sealing  
pressure applied to compression seal 42. In the  
10 illustrated example, a rectangularly-shaped bracket 161 is  
positioned within the interior of door 4, and is fixedly  
connected with the adjacent surfaces thereof. Bracket 161  
includes vertically aligned apertures through its upper  
and lower plates 162 and 163 respectively, and a pair of  
15 threaded nuts 164 are positioned on that portion of the  
threaded lock pin end 160 disposed between bracket plates  
162 and 163. Nuts 164 are tightened outwardly against the  
upper and lower plates 162 and 163 of bracket 160 to  
securely, yet adjustably anchor lock pin 150 in door 4.

20 A semicircular, vertically oriented sleeve or  
column 166 is formed in the front wall 29 of bathtub 2, in  
vertical alignment with lock pin 150. Column 166 includes  
a cylindrical aperture 167 extending through its center,  
which is shaped to closely receive lock pin 150 therein.  
25 A pair of spring loaded, ball retainers 168 are mounted in  
an upper portion of column 166, and are adapted to engage  
the mating groove 159 in lock pin 150 so as to hold door 4  
in the initial closed position shown in Fig 13, against  
the tension of the spring counterbalance 88, so that latch  
30 arm 151 will be in proper lateral alignment with lock pin  
150 to fully close and lock door 4.



1           Latch arm 151 has a plate-shaped body 172, with a  
fork or claw 173 located at the upper end thereof, which  
extends through a mating slot 174 into the center aperture  
167 of column 166. Claw 173 includes a pair of prongs,  
5           which are laterally spaced apart, and are shaped to be  
received over the shank 157 of lock pin 150, and to engage  
the lock pin head 158. The latch arm body 172 is  
slidingly received and retained between a pair of parallel  
10          bracket plates 175 that are fixedly connected with bathtub  
2. Bracket plates 175 include a pair of transversely  
aligned slots 176, having a laterally extending,  
downwardly inclined upper leg 177, and a vertically  
extending lower leg 178 communicating therewith. A  
laterally extending pin 179 is mounted in the body portion  
15          172 of latch arm 151, and the opposite ends of pin 179  
extend through the aligned slots 176 to form a cam and a  
cam follower that shifts latch arm 151 laterally outwardly  
and downwardly in a predetermined pattern and sequence. A  
link 180 is pivotally mounted between bracket plates 175  
20          at a medial portion of the link by a pin 181. One end of  
link 180 is pivotally connected with the lower end of  
latch arm body 172 by a pin 182. Hydraulic jack 153 has a  
stationary base attached fixedly to the frame of bathing  
unit 1, and an upper, reciprocating rod end 183 pivotally  
25          attached to the opposite end of link 180 by a pin 184. A  
return spring 185 has one end connected with the outwardly  
protruding end of link 180, and the other end is connected  
with a stationary surface, such as the frame of bathing  
unit 1. Preferably, hydraulic jack 153 is actuated by  
30          pressurized water which is available in the bathing unit,  
and in the illustrated example, hydraulic jack 153

1 communicates with actuator valve 10 through flexible  
plumbing line 121.

In operation, door lock 1 functions in the following manner. Door 4 is lowered until spring loaded  
5 latch balls 168 are engaged in the mating groove 159 of lock pin 150, as illustrated in Fig. 13. The snap-lock formed by latch balls 168 retains door 4 in place against the force of the spring loaded counterbalance 88 in a predetermined position, in which the claw 173 of latch  
10 arm 151 is aligned with the shank portion 157 of lock pin 150. To lock door 4, the user simply shifts door valve actuator 10 to the open position, thereby communicating pressurized water with hydraulic jack 153. The reciprocating end 183 of the jack is thereby forced  
15 upwardly, and link 179 is rotated in a clockwise direction, as viewed in Figs 12-15. The rotating motion of link 180 exerts a downward force on the lower end of latch arm 151, causing the upper end of latch arm 151 to move laterally outwardly and downwardly as cam pin 179  
20 follows the upper legs 177 of cam slots 176. The claw portion 173 of latch arm 151 is thereby moved laterally outwardly over the shank 157 of lock pin 150, and into engagement with the lock pin head 158, as illustrated in Fig. 14. Continued rotation of link 180 pulls cam pin 179  
25 downwardly along the lower legs 178 of cam slots 176. The latch arm claw 173 thereby pulls lock pin 150 downwardly, thereby compressing seal 42 securely between the lip 40 of bathtub 2, and the sealing edge 42 of door 4, as illustrated in Fig. 15. As long as the door lock  
30 controller valve 10 remains open, the closing force exerted on door 4 by hydraulic jack 153 will continue,

1           thereby securely locking door 4 in place. Hydraulic jack  
153 preferably includes a check valve or back flow  
preventor, which will insure that the pressure in  
hydraulic jack 153 is maintained, even if there is a  
5           temporary interruption of water pressure. Furthermore,  
when door 4 is fully closed, and bathtub 2 is filled with  
water, the hydraulic pressure from the water in the tub  
which acts laterally on door 4 causes lock pin 150 to  
engage the outer surface of mating column 166 to resist  
10          these forces. The frictional forces that thereby develop  
between lock pin 150 and column 166 will retain door 4 in  
the fully closed and sealed position, even if door lock 7  
is inadvertently released.

          After bathtub 2 has been drained, to release door  
15          lock 7, the bather simply closes valve controller 10,  
thereby removing the water pressure acting on hydraulic  
jack 153. Return spring 185, in conjunction with the  
resiliency of compression seal 42, rotates link 180 in a  
counterclockwise direction, as viewed in Figs. 12-15,  
20          thereby raising latch arm 151 and moving claw 173  
laterally outwardly from engagement with the lock pin head  
158. Door 4 is then lifted upwardly manually, with the  
assistance of counterbalance 88, to the fully open  
position.

25               In operation, bathing unit 1 is designed to be  
used as follows. With door 4 in the fully open position  
(Fig. 1), the bather positions himself facing the front of  
bathtub 2, adjacent seat 18. The bather then grasps the  
left-hand support rod 8 in his right hand, and turns  
30          around 180 degrees, with his back oriented toward bathtub  
seat 18. The bather then grasps the right-hand support

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1 post 131 for console 6 with his left hand, and lowers his  
buttocks onto the seat portion 19 of seat 18, as  
illustrated in Fig. 16. The bather then rotates his legs  
inwardly into footwell 21. With his right hand, the  
5 bather then grasps handle 56 on door 4, and pulls door 4  
downwardly until snap-lock 168 is engaged. The bather  
then grasps handle 126 on adjustable control console 6,  
and pulls the same forwardly to a convenient location at  
which he can easily manipulate the various controls. The  
10 bather then manipulates door lock actuator 10, which fully  
closes and seals door 4, as shown in Fig. 18. The bather  
then adjusts the temperature of the water, and actuates  
the tub-fill and/or the shower head, as the bather so  
desires. For immersal bathing, drain valve 25 is closed  
15 by manipulating controller 115. When bathtub 2 is at  
least partially filled, the bather may then actuate the  
whirlpool, and adjust the level of aeration accordingly.

When the bather is finished, the water and  
whirlpool controllers 113-114 and 116-117 are shut off,  
20 and the drain valve controller 115 is shifted to the open  
position. As soon as the water has drained from bathtub  
2, door lock 7 is deactivated by manipulating controller  
10, control console 6 is pushed forwardly to the  
retracted, out of the way storage position, and the bather  
25 pulls upwardly on door 4. As soon as the snap-lock 168  
has been released, door 4 will automatically raise to the  
fully open position under the spring tension of  
counterbalance 88. The bather may then exit bathtub 2 by  
using the combination support posts and grab bars 8 and  
30 131.

1                   Bathing unit 1 is particularly designed for home  
 use, since door 4 and water controls 109 can be easily  
 operated by the user himself from within the bathtub 2.  
 The combination door guide and grab bar arrangement 5 not  
 5                   only provides for a smooth, easily operating door, which  
 can be manually manipulated by even those of limited  
 physical strength or dexterity, but it also assists in  
 safely entering and exiting the bathtub. The adjustable  
 control console 6 gives the bather easy access to all of  
 10                   the controls 109 for the various bathing functions when he  
 is seated in bathtub 2. Yet, adjustable control console 6  
 can be moved out of the way into a retracted storage  
 position to provide unhindered ingress and egress to  
 bathtub 2. The power door lock 7 securely closes door 4  
 15                   in a manner that forms a watertight seal, and does not  
 require any significant degree of physical strength or  
 dexterity to operate. The actuator for power door lock 7  
 is also positioned on adjustable control console 6, so  
 that all of the bathtub functions can be readily  
 20                   controlled by the bather himself from within bathtub 2.

                  In the foregoing description, it will be readily  
 appreciated by those skilled in the art that modifications  
 may be made to the invention, without departing from the  
 concepts disclosed herein. Such modifications are to be  
 25                   considered as included in the following claims, unless  
 these claims by their language expressly state otherwise.

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The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows.

-1-

- 1           A home bathing unit, comprising:
- a bathtub having opposite sidewalls and end walls, with an access opening in one of said sidewalls for bather ingress and egress therethrough;
- 5           a seat located in said bathtub adjacent to one of said end walls;
- a door shaped to selectively close said access opening;
- means for vertically guiding said door between a fully open position wherein bather movement through said access opening is permitted, and a fully closed position wherein said door sealingly closes said access opening;
- 10           means for securely locking said door in the fully closed position;
- 15           a lock actuator operably connected with said locking means, and positioned to be manipulated by a bather disposed on the seat in said bathtub;
- a handle located on said door at a position thereon from which a bather disposed on the seat in said bathtub can grasp said handle and manually translate said door between the fully open and fully closed positions;
- 20           a door controller, having means for retaining said door in said fully open position until moved therefrom by the bather, and means for adjusting the height of said door in the fully open position, so that said door is high enough to permit the bather to readily enter said bathing unit through said access opening, yet
- 25

low enough to permit the bather, when disposed on the seat  
in said bathtub, to reach said handle and close said door,  
30 whereby the bather may enter and exit the bathing unit,  
and open, close and lock said door by himself from a  
seated position within said bathtub, without requiring an  
assistant.

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1 A home bathing unit as set forth in claim 1,  
wherein:

said door controller further comprises a spring  
loaded counterbalance operably connected with said door,  
5 and resiliently retaining said door in the fully open  
position.

-3-

1 A home bathing unit as set forth in claim 2,  
wherein:

said door height adjustment means comprises means  
for adjusting spring tension in said counterbalance.

-4-

1 A home bathing unit as set forth in claim 3,  
wherein:

said door height adjustment means further  
comprises a stop connected with one of said door and said  
5 bathtub, and shaped to abuttingly engage the other of said  
door and said bathtub to positively locate said door in  
the fully open position.

-5-

1 A home bathing unit as set forth in claim 4,  
wherein said door guiding means comprises:

a combination door guide and grab bar  
arrangement, including a pair of upright support posts



5 positioned adjacent opposite side edges of said door, and  
 guides mounted on the opposite side edges of said door and  
 telescopingly received over said support posts for sliding  
 translation therealong, whereby said support posts both  
 guide said door between the fully open and fully closed  
 10 positions, and also provide vertical grab bars along the  
 sides of said access opening to facilitate bather ingress  
 and egress therethrough without interfering with the  
 operation of said door.

-6-

1 A home bathing unit as set forth in claim 5,  
 including:

an adjustable control console mounted on the end  
 wall of said bathtub opposite said seat for sliding  
 5 movement along a generally horizontal plane, and including  
 a handle positioned to be grasped by a bather disposed on  
 the seat in said bathtub, whereby the seated bather may  
 himself vary the fore-to-aft position of said console with  
 respect to said seat for ease of operation.

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1 A home bathing unit as set forth in claim 6,  
 wherein:

said lock actuator is mounted on said adjustable  
 control console.

-8-

1 A home bathing unit as set forth in claim 7,  
 including:

a bathtub fill spout attached to said adjustable  
 control console, and translating therewith; and

5 means for nonrigidly communicating said bathtub  
 fill spout with a source of pressurized water.

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-9-

1 A home bathing unit as set forth in claim 8,  
wherein said door locking means comprises:

a lock pin connected with said door and  
protruding outwardly from a lower edge of said door;

5 a latch arm connected with said bathtub, and  
shaped to matingly engage said lock pin when said door is  
in an initial closed position;

power means for mechanically moving said latch  
arm laterally into engagement with said lock pin;

10 power means for mechanically moving said latch  
arm longitudinally, and pulling said lock pin and said  
door downwardly until said door is in the fully closed  
position; and

means for retaining said door in the fully closed  
15 position until released therefrom.

-10-

1 A home bathing unit as set forth in claim 9,  
wherein:

said power means includes a hydraulic ram  
actuated by water pressure.

-11-

1 A home bathing unit as set forth in claim 10,  
wherein:

said lock actuator comprises a valve which  
controls water pressure to said hydraulic ram.

-12-

1 A home bathing unit as set forth in claim 11,  
wherein:

said access opening is defined by a lip having an  
upwardly opening, wedge-shaped contour; and

5           said door has a wedge-shaped sealing edge which  
conforms to the contour of said lip.

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1           A home bathing unit as set forth in claim 12,  
including:

          a compression seal positioned between the lip on  
said bathtub and the sealing edge of said door.

-14-

1           A home bathing unit as set forth in claim 13,  
including:

          means for adjusting the effective length of said  
lock pin to vary compression force applied to said seal.

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1           A home bathing unit as set forth in claim 14,  
wherein:

          said bathtub lip and said door sealing edge have  
an arcuate, front-elevational shape.

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1           A home bathing unit as set forth in claim 15,  
wherein:

          said bathtub lip and said door sealing edge have  
a generally semicircular, front-elevational shape to  
5       facilitate substantially uniform compression of said seal.

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1           A home bathing unit as set forth in claim 16,  
wherein:

          said seat is integrally formed with said bathtub,  
and comprises a seat portion disposed at an elevation  
5       substantially commensurate with conventional chair height,  
a back portion extending generally upwardly from said seat  
portion, and a foot portion disposed below and forward of

said seat portion.

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1 A home bathing unit as set forth in claim 17,  
wherein:

said seat, back and foot portions are integrally  
formed, and have an anatomical shape for comfortably  
5 supporting a seated bather.

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1 A home bathing unit as set forth in claim 18,  
wherein:

said door support posts have a generally inverted  
L-shape in side elevation; and  
5 said guides are pivotal with respect to said  
door, whereby said door may assume an overhead storage  
position.

-20-

1 A home bathing unit as set forth in claim 1,  
wherein said door guiding means comprises:

a combination door guide and grab bar  
arrangement, including a pair of upright support posts  
5 positioned adjacent opposite side edges of said door, and  
guides mounted on the opposite side edges of said door and  
telescopingly received over said support posts for sliding  
translation therealong, whereby said support posts both  
guide said door between the fully open and fully closed  
10 positions, and also provide vertical grab bars along the  
sides of said access opening to facilitate bather ingress  
and egress therethrough without interfering with the  
operation of said door.

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1 A home bathing unit as set forth in claim 20,  
wherein:

said door support posts have a generally inverted  
L-shape in side elevation; and

5 said guides are pivotal with respect to said  
door, whereby said door may assume an overhead storage  
position.

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1 A home bathing unit as set forth in claim 1,  
including:

an adjustable control console mounted on the end  
wall of said bathtub opposite said seat for sliding  
5 movement along a generally horizontal plane, and including  
a handle positioned to be grasped by a bather disposed on  
the seat in said bathtub, whereby a seated bather may  
himself vary the fore-to-aft position of said console with  
respect to said seat for ease of operation.

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1 A home bathing unit as set forth in claim 1,  
wherein said door locking means comprises:

a lock pin connected with said door and  
protruding outwardly from a lower edge of said door;

5 a latch arm connected with said bathtub, and  
shaped to matingly engage said lock pin when said door is  
in an initial closed position;

power means for mechanically moving said latch  
arm laterally into engagement with said lock pin;

10 power means for mechanically moving said latch  
arm longitudinally, and pulling said lock pin and said  
door downwardly until said door is in the fully closed

position; and

15 means for retaining said door in the fully closed position until released therefrom.

-24-

1 A home bathing unit as set forth in claim 1, wherein:

said access opening is defined by a lip having an upwardly opening, wedge-shaped contour;

5 said door has a wedge-shaped sealing edge which conforms to the contour of said lip;

a compression seal is positioned between the lip on said bathtub and the sealing edge of said door; and

10 said bathtub lip and said door sealing edge have a generally semicircular, front-elevational shape to facilitate substantially uniform compression of said seal.

-25-

1 In a bathing apparatus of the type having a bathtub with an access opening in one side thereof, and a vertically translating door selectively closing said access opening, the improvement of a combination door guide and grab bar arrangement comprising:

5 a pair of upright support posts positioned adjacent opposite side edges of said door, and disposed in a mutually parallel and generally vertical orientation;

10 guides mounted on the opposite side edges of said door, and being telescopingly received over said support posts for sliding translation therealong, whereby said support posts both guide said door between open and closed positions, and also provide vertical grab bars along the sides of said access opening to facilitate user ingress

15 and egress, without interfering with the operation of said door.

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1 A bathing apparatus as set forth in claim 25,  
wherein said guides comprise:

a first pair of sleeve-shaped guides, mounted in the side edges of said door adjacent an upper edge thereof;

5 a second pair of sleeve-shaped guides mounted in the side edges of said door adjacent a lower edge thereof, whereby both sides of said door are securely and evenly supported on said support posts for smooth, non-binding translation therealong.

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1 A bathing apparatus as set forth in claim 26,  
wherein:

said door support posts have a generally inverted L-shape in side elevation; and

5 at least said first pair of guides are pivotal with respect to said door, whereby said door may assume an overhead storage position.

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1 A bathing apparatus as set forth in claim 27,  
wherein:

said second pair of guides are pivotal with respect to said door, whereby said door may assume a fully overhead storage position.

-29-

1 A bathing apparatus as set forth in claim 28,  
wherein:

at least one of said support posts includes a support bracket extending outwardly therefrom to attach

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5       said support post to a stationary surface; and  
           at least one of said first and second pairs of  
       guides includes a longitudinally extending slot through  
       which said rod support bracket passes as said door is  
       translated between the open and closed positions.

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1       A bathing apparatus as set forth in claim 29,  
       wherein:  
           said support posts have a cylindrical shape; and  
           said guides have a generally cylindrical shape,  
       5       with antifriction inserts therein which glide over the  
       exterior surfaces of said support posts.

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1       A bathing apparatus as set forth in claim 30,  
       wherein:  
           said guides each include a laterally extending  
       mounting pin; and  
       5       said door includes antifriction bushings mounted  
       in the side edges thereof in which an associated mounting  
       pin of said guides is closely received to rotatably mount  
       said guides in said door.

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1       A bathing apparatus as set forth in claim 31,  
       including:  
           coil springs positioned over the mounting pins of  
       said guides, and resiliently urging the side edges of said  
       5       door inwardly, whereby said door floats laterally between  
       said guides for non-binding translation over said support  
       posts.

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1           A bathing apparatus as set forth in claim 32,  
wherein:  
          said access opening is defined by a lip having an  
upwardly opening, wedge-shaped contour;  
5           said door has a wedge-shaped sealing edge which  
conforms to the contour of said lip; and  
          a compression seal is disposed between the lip of  
said bathtub and the sealing edge of said door, whereby  
said bathtub lip and said door sealing edge self-align as  
10          said door floats laterally between said guides.

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1           A bathing apparatus as set forth in claim 25,  
wherein:  
          said support posts include at least one support  
bracket extending outwardly therefrom to attach said  
5          support posts to a stationary surface; and  
          at least one of said first and second pairs of  
guides includes longitudinally extending slots through  
which said rod support brackets pass as said door is  
translated between the open and closed positions.

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1           In a bathing apparatus of the type having a  
bathtub with at least one water dispenser, a seat area at  
one end of said bathtub, and a controller for said water  
dispenser at the other end of said bathtub, the  
5          improvement of an adjustable console comprising:  
          a cabinet having a chassis, and a front plate  
facing the one end of said bathtub;  
          means for connecting said controller to said  
chassis, with a variable actuator portion of said

-39-

10 controller extending through said front plate and  
accessible to a user disposed at the seat area of said  
bathtub;

a console support connected with said bathtub,  
and having means for slidably mounting said cabinet  
15 thereon at the other end of said bathtub for selective  
movement along a generally horizontal plane; and

means for non-rigidly communicating said  
controller with a source of pressurized water, whereby  
said console is bodily translated along said support to  
20 adjust the fore-to-aft position of said console with  
respect to the seat area of said bathtub for a particular  
user, such that variously sized users can readily grasp  
and manipulate the actuator portion of said controller.

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1 A bathing apparatus as set forth in claim 35,  
including:

a handle connected with said adjustable console,  
and positioned to be grasped by a user disposed in the  
5 seat area of said bathtub, whereby the user may himself  
adjust the position of said console, without requiring an  
assistant.

-37-

1 A bathing apparatus as set forth in claim 36,  
wherein said bathtub includes:

opposite sidewalls, and front and rear end walls,  
with an access opening in one of said sidewalls for user  
5 ingress and egress therethrough; and

a door selectively closing said access opening.

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-38-

1 A bathing apparatus as set forth in claim 37,  
wherein:

said console support comprises a combination  
support and grab bar arrangement, including:

5 a first post having a straight, horizontally  
oriented upper leg with one end thereof mounted  
in the front end wall of said bathtub adjacent  
said access opening, and the other end formed  
into a handle;

10 a guide attached to said cabinet and  
telescopingly received over the upper leg of said  
first post for slidingly supporting said console  
for translation therealong.

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1 A bathing apparatus as set forth in claim 38,  
wherein said combination support and grab bar arrangement  
further comprises:

5 a second post having a straight, horizontally  
oriented upper leg with one end thereof mounted in the  
front end wall of said bathtub adjacent the other sidewall  
of said bathtub, and the other end formed into a handle;  
and

10 a guide attached to said cabinet and  
telescopingly received over the upper leg of said second  
post and slidingly supporting said console for translation  
therealong.

-40-

1 A bathing apparatus as set forth in claim 39,  
wherein:

-41-

5           said first post has a straight downwardly  
inclined lower leg with one end thereof mounted in the  
front end wall of said bathtub adjacent said access  
opening, and below the upper leg of said first post; and  
said first post has an arcuate intermediate portion  
interconnecting the other ends of the upper and lower legs  
of said first post, and forming a grab handle.

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1           A bathing apparatus as set forth in claim 40,  
wherein:

5           said second post has a straight, downwardly  
inclined lower leg, with one end thereof mounted in the  
other sidewall of said bathtub adjacent an armrest portion  
thereof, and the other end connected with the other end of  
the upper leg of said second post.

-42-

1           A bathing apparatus as set forth in claim 41,  
wherein:

          said first and second posts are positioned on  
opposite sides of said cabinet for secure support.

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1           A bathing apparatus as set forth in claim 42,  
including:

          a bathtub fill spout connected with said cabinet  
and translating therewith; and

5           means for non-rigidly communicating said bathtub  
fill spout with a source of pressurized water.

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1           A bathing apparatus as set forth in claim 43,  
wherein:

-42-

said water dispenser comprises a shower head with  
a flexible supply hose.

-45-

1 A bathing apparatus as set forth in claim 44  
including:

means for controlling water flow through said  
bathtub fill spout, being mounted in said cabinet and  
5 operable from the front plate thereof.

-46-

1 A bathing apparatus as set forth in claim 45,  
including:

means for controlling water flow through said  
shower head, being mounted in said cabinet, and operable  
5 from the front plate thereof.

-47-

1 A bathing apparatus as set forth in claim 46,  
including:

means for controlling the temperature of water  
flowing through said bathtub fill spout and said shower  
5 head, being mounted in said cabinet, and operable from the  
front plate thereof.

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1 A bathing apparatus as set forth in claim 47,  
including:

a lock for selectively retaining said door in the  
closed position; and

5 means for controlling said door lock, being  
mounted in said cabinet, and operable from the front plate  
thereof.

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1 A bathing apparatus as set forth in claim 48,  
including:

a drain mounted in a floor portion of said  
bathtub, and including a shut-off valve; and

5 means for controlling said drain shut-off valve,  
being mounted in said cabinet, and operable from the front  
plate thereof.

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1 A bathing apparatus as set forth in claim 49,  
including:

means for swirling and aerating water in said  
bathtub; and

5 means for controlling said water swirling and  
aerating means, with an actuator portion thereof being  
mounted in said cabinet, and operable from the front plate  
thereof.

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1 A bathing apparatus as set forth in claim 35,  
including:

a bathtub fill spout connected with said cabinet  
and translating therewith; and

5 means for non-rigidly communicating said bathtub  
fill spout with a source of pressurized water.

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1 A bathing apparatus as set forth in claim 35,  
wherein:

said water dispenser comprises a shower head with  
a flexible supply hose.

1           In a bathing apparatus of the type having a  
bathtub with a seat area at one end thereof, an access  
opening in one side of said bathtub, a vertically  
translating door selectively closing the opening, and a  
5       lock for retaining said door in a fully closed and sealed  
position, the improvement of an adjustable console,  
comprising:

          a cabinet having a chassis, and a front plate  
facing the one end of said bathtub:

10           a motor for shifting said door lock between  
locked and unlocked positions, and including a remote  
controller therefor;

          means for connecting said lock controller with  
said chassis, with an actuator portion of said lock  
15       controller extending through said front plate, and  
accessible to a user disposed in the seat area of said  
bathtub;

          a console support connected with said bathtub,  
and having means for slidably mounting said cabinet  
20       thereon at the other end of said bathtub for selective  
movement along a generally horizontal plane; and

          means for non-rigidly connecting said lock  
controller with said motor, whereby said console is  
bodily translated along said support to adjust the  
25       fore-to-aft position of said console with respect to the  
seat area of said bathtub for a particular user, such that  
variously sized users can readily grasp and manipulate the  
actuator portion of said lock controller.

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1           A bathing apparatus as set forth in claim 53,  
including:

          a handle connected with said adjustable console,  
and positioned to be grasped by a user disposed in the  
5       seat area of said bathtub, whereby the user may himself  
adjust the position of said console, without requiring an  
assistant.

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1           In a bathing apparatus of the type having a  
bathtub with an access opening defined by a lip having an  
upwardly opening, wedge-shaped contour, and a vertically  
translating door with a wedge-shaped sealing edge which  
5       conforms to the contour of said lip, and a compression  
seal positioned between said lip and said sealing edge, an  
improved locking arrangement for said door, comprising:

          a lock pin connected with said door and  
protruding outwardly from a lower edge of said door;  
10       a latch arm connected with said bathtub, and  
shaped to matingly engage said lock pin when said door is  
in an initial closed position;

          power means for mechanically moving said latch  
arm laterally into engagement with said lock pin;

15       power means for mechanically moving said latch  
arm longitudinally, and pulling said lock pin and said  
door downwardly until said compression seal is seated  
between the lip of said bathtub and the sealing edge of  
said door to form a watertight seal therebetween, and  
20       thereby define a fully closed door position; and

          means for retaining said door in the fully closed  
position until released therefrom.

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1 A bathing apparatus as set forth in claim 55,  
wherein:

said power means for moving said latch arm  
laterally and longitudinally includes a hydraulic ram  
5 actuated by water pressure.

1 A bathing apparatus as set forth in claim 56,  
wherein:

said lock pin is cylindrically shaped, and  
includes an elongate, annular slot adjacent the free end  
5 thereof which defines shank and head portions of said lock  
pin; and

said latch arm includes a fork with two prongs at  
the free end thereof shaped for reception over said pin  
shank and engagement with the head portion of said lock  
10 pin.

1 A bathing apparatus as set forth in claim 57,  
including:

a snap lock selectively retaining said door in  
said initial closed position in which said fork is  
5 laterally aligned with the mating slot in said lock pin  
for engagement therewith.

1 A bathing apparatus as set forth in claim 58,  
including:

means for adjusting the effective length of said  
lock pin to vary pressure on said compression seal.

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1           A bathing apparatus as set forth in claim 59,  
wherein said power means for moving said latch arm  
laterally and longitudinally further comprises:

5           a cam-slide linkage connected with a  
reciprocating end of said hydraulic ram.

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1           A bathing apparatus as set forth in claim 60,  
wherein said cam-slide linkage comprises:

5           a bracket fixedly connected with said bathtub,  
and including two, spaced-apart, parallel plates between  
which a body portion of said latch arm is closely and  
slidingly received;

10           a pair of aligned slots in said bracket plates,  
having a laterally extending, downwardly inclined upper  
leg, and a vertically extending lower leg communicating  
therewith;

          a pin mounted in the body portion of said latch  
arm, having opposite ends thereof extending through said  
aligned slots; and

15           a link pivotally mounted between said bracket  
plates at a medial portion of said link; a first end of  
said link being pivotally connected with the reciprocating  
end of said hydraulic jack, and a second end of said link  
being pivotally connected with a lower end of said latch  
arm, whereby extension of said hydraulic jack shifts said  
20           latch arm along the path of said aligned slots, laterally  
outwardly to engage said fork in the annular slot in said  
lock pin, thence vertically downwardly to pull said door  
into the fully closed position.

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1 A bathing apparatus as set forth in claim 61,  
wherein said cam-slide linkage further comprises:

5 a return spring connected with the first end of  
said link to automatically return said latch arm to a  
raised, unlocked position.

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1 A bathing apparatus as set forth in claim 62,  
including:

5 a valve controlling the supply of pressurized  
water to said hydraulic ram, and defining said door  
retaining means.

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1 A bathing apparatus as set forth in claim 55,  
wherein:

5 said lock pin is cylindrically shaped, and  
includes an elongate, annular slot adjacent the free end  
thereof which defines shank and head portions of said lock  
pin; and

10 said latch arm includes a fork with two prongs at  
the free end thereof shaped for reception over said pin  
shank and engagement with the head portion of said lock  
pin.

-65-

1 A bathing apparatus as set forth in claim 55,  
including:

5 a snap lock selectively retaining said door in  
said initial closed position, in which said fork is  
laterally aligned with the mating annular slot in said  
lock pin for engagement therewith.

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1           A bathing apparatus as set forth in claim 55,  
including:

          means for adjusting the effective length of said  
lock pin to vary pressure on said compression seal.

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1           A bathing apparatus as set forth in claim 55,  
wherein said power means for moving said latch arm  
laterally and longitudinally comprises:

          a linear motor; and

5           a cam-slide linkage connected between said latch  
arm and a reciprocating end of said linear motor.



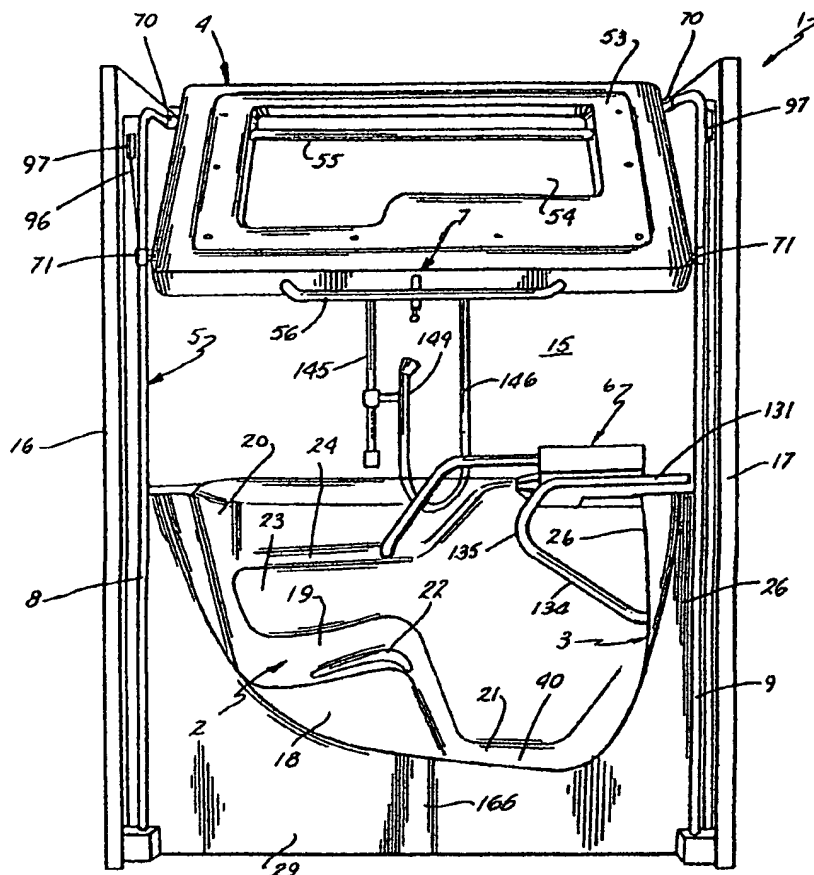


Fig. 1.

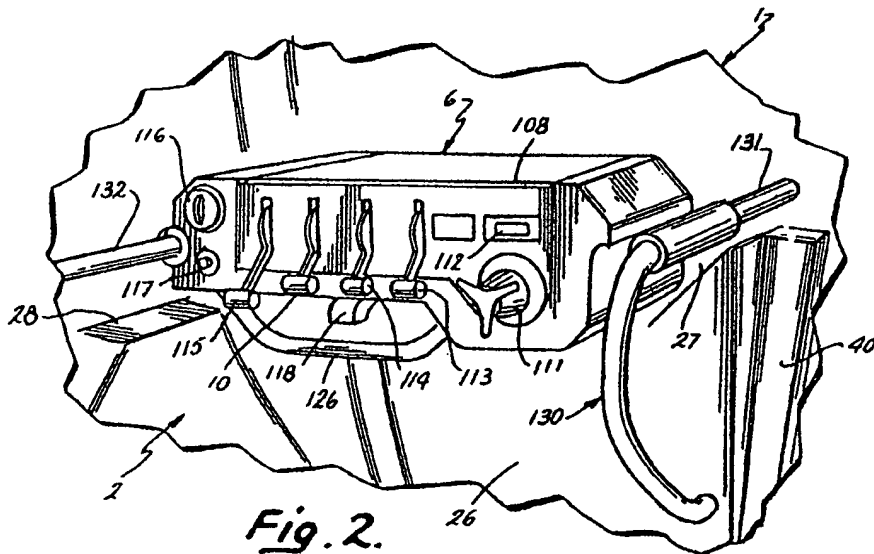


Fig. 2.

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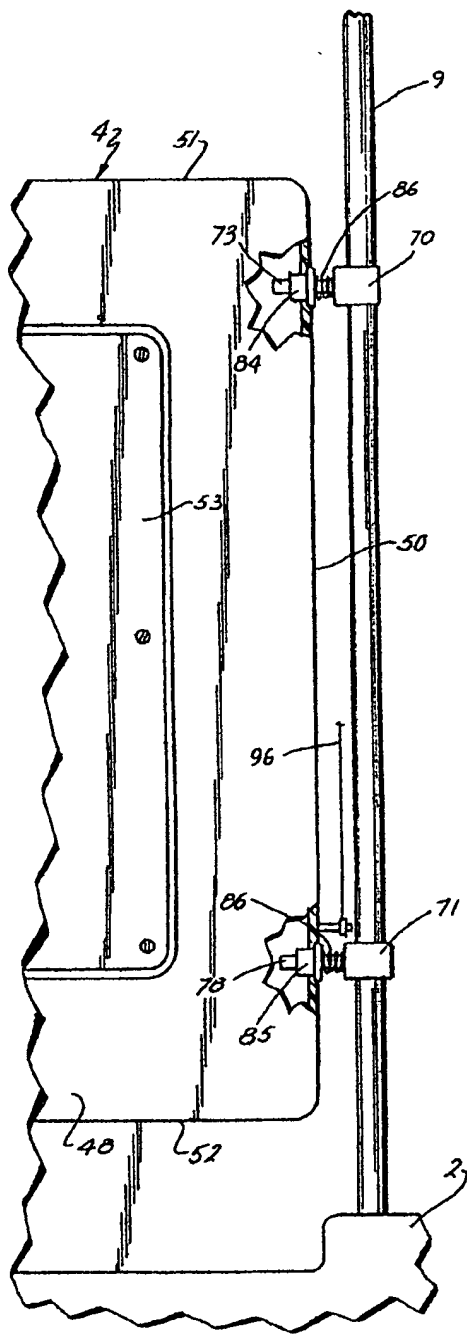


Fig. 3.

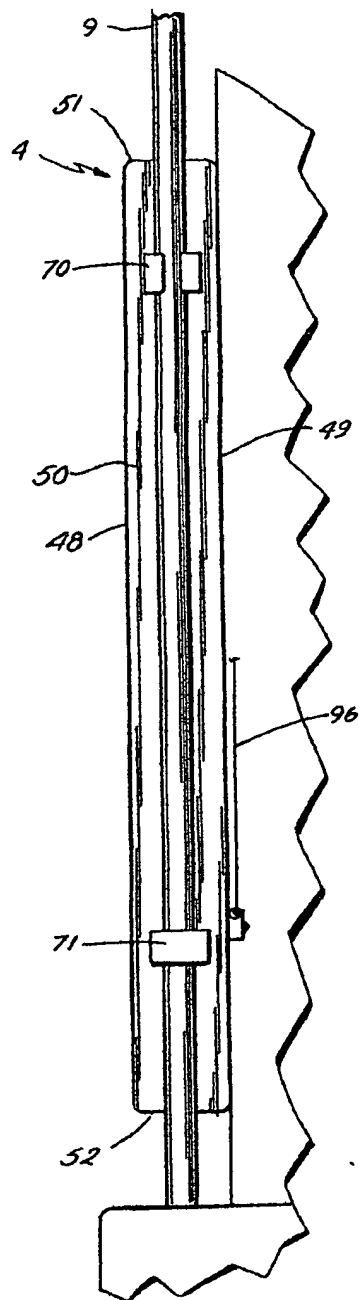
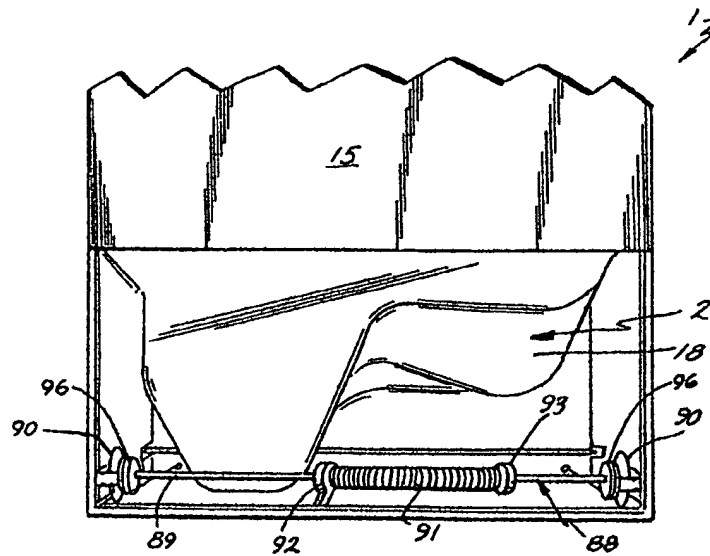
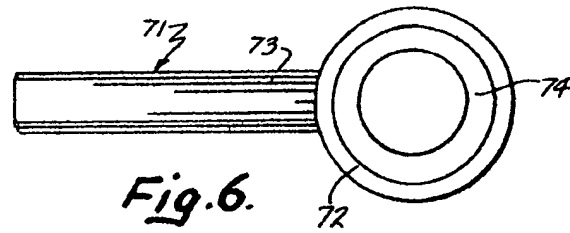
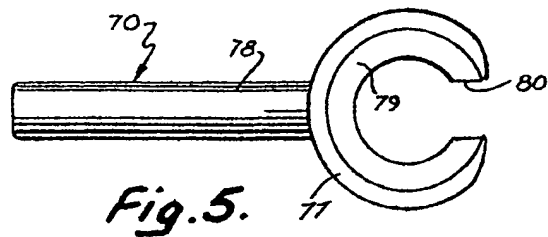


Fig. 4.

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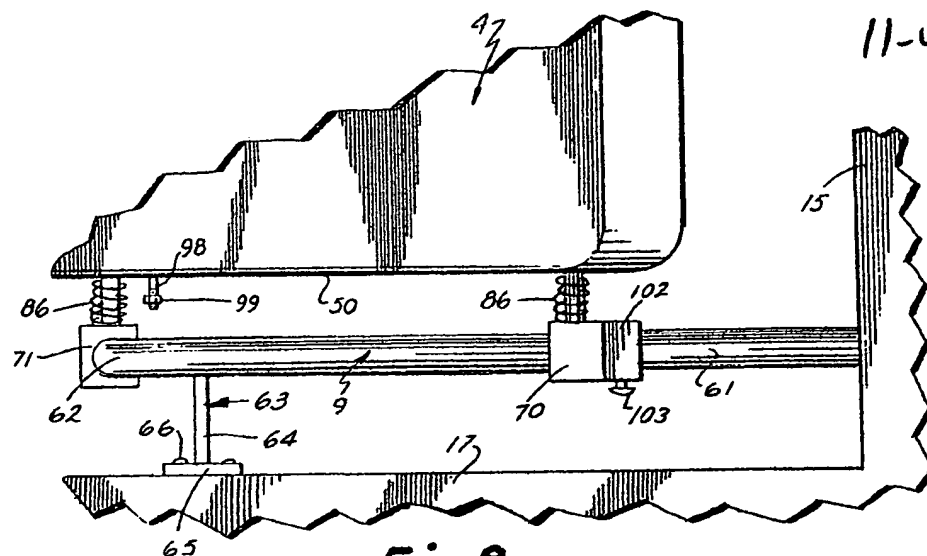


Fig. 8

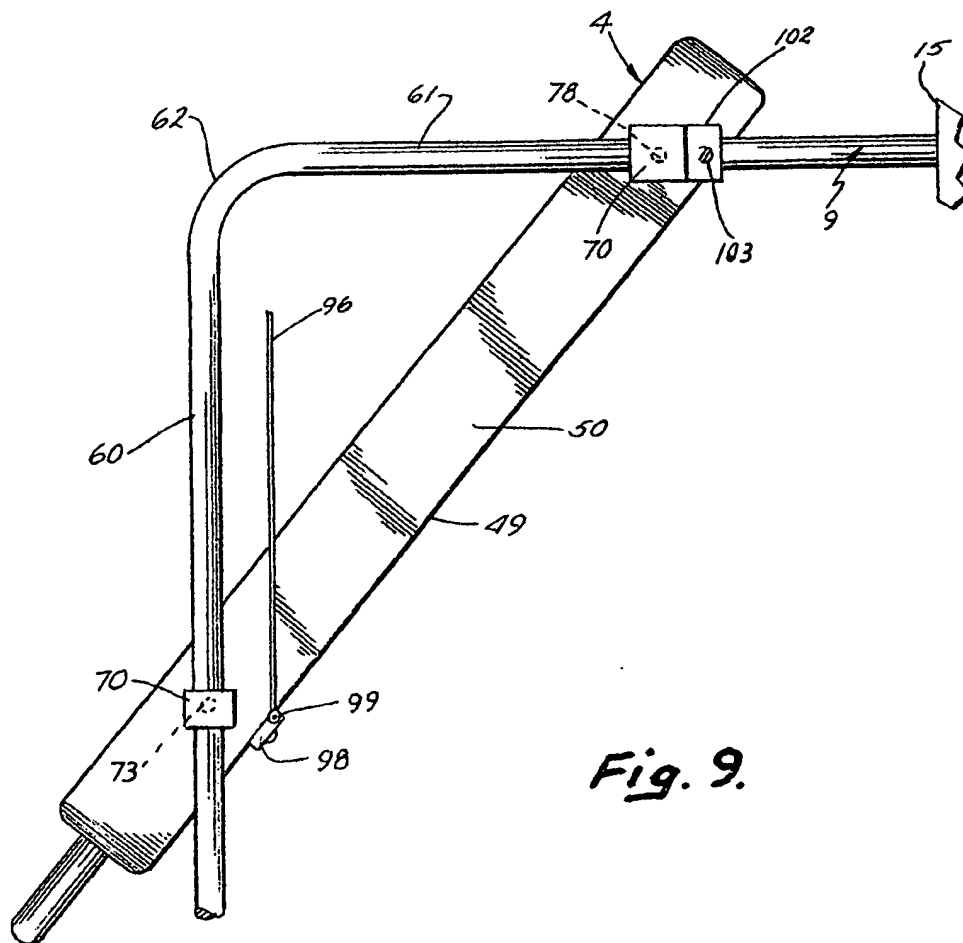


Fig. 9.

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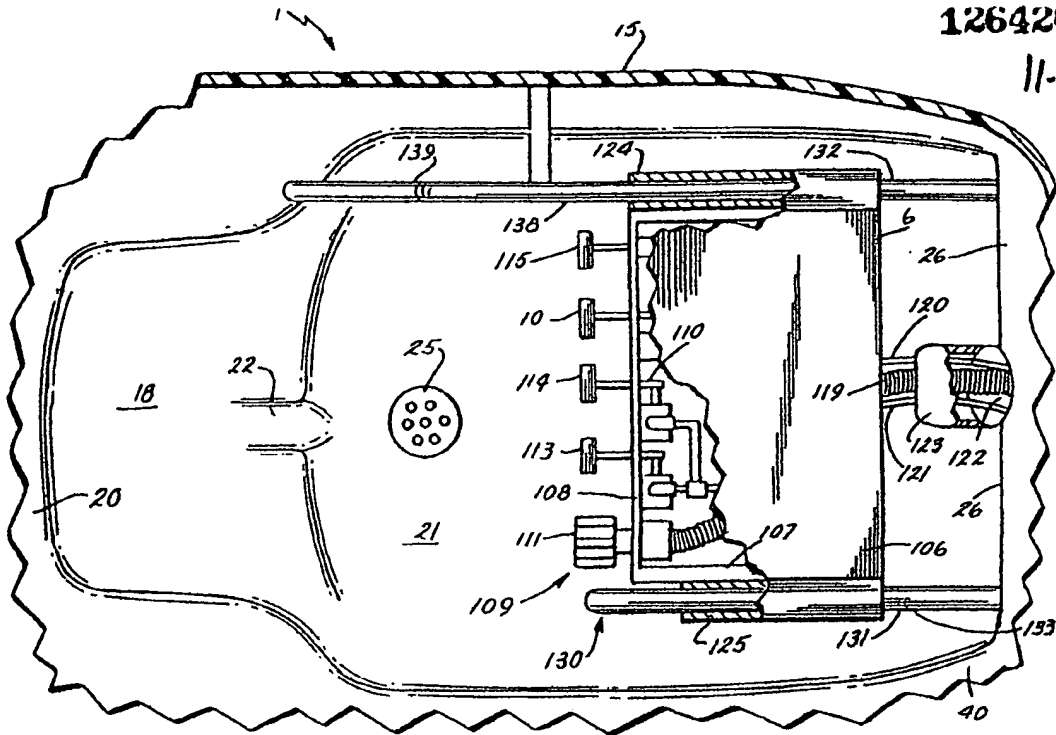


Fig. 10.

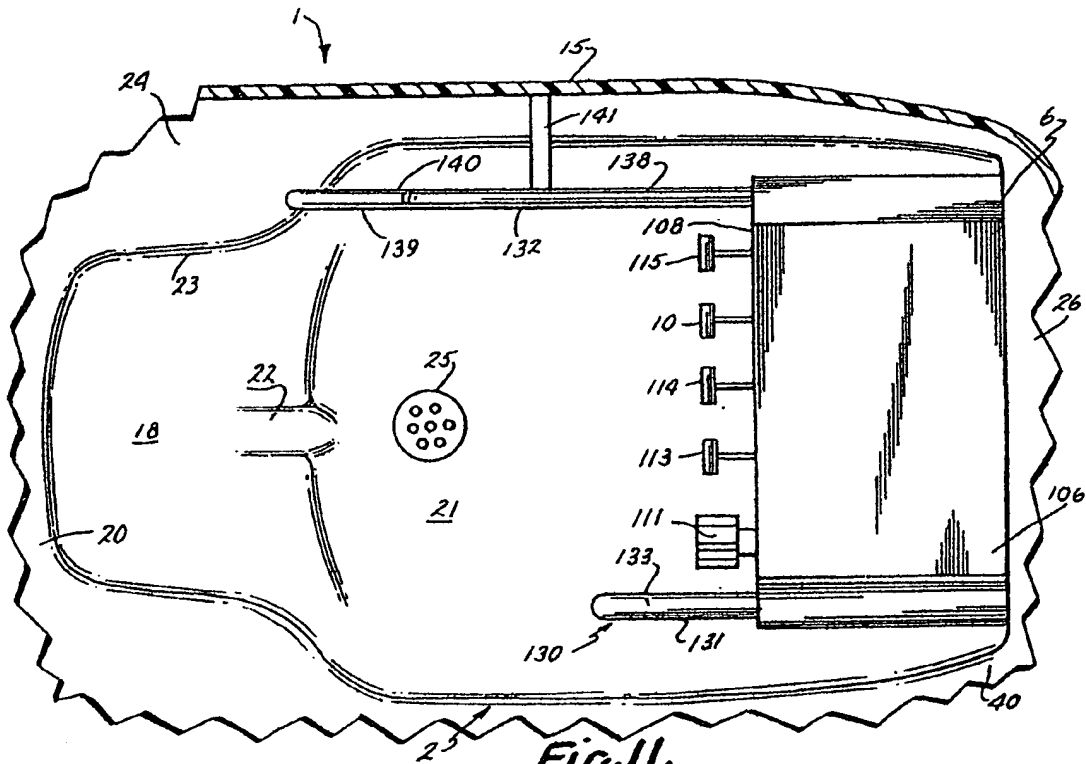


Fig. 11.

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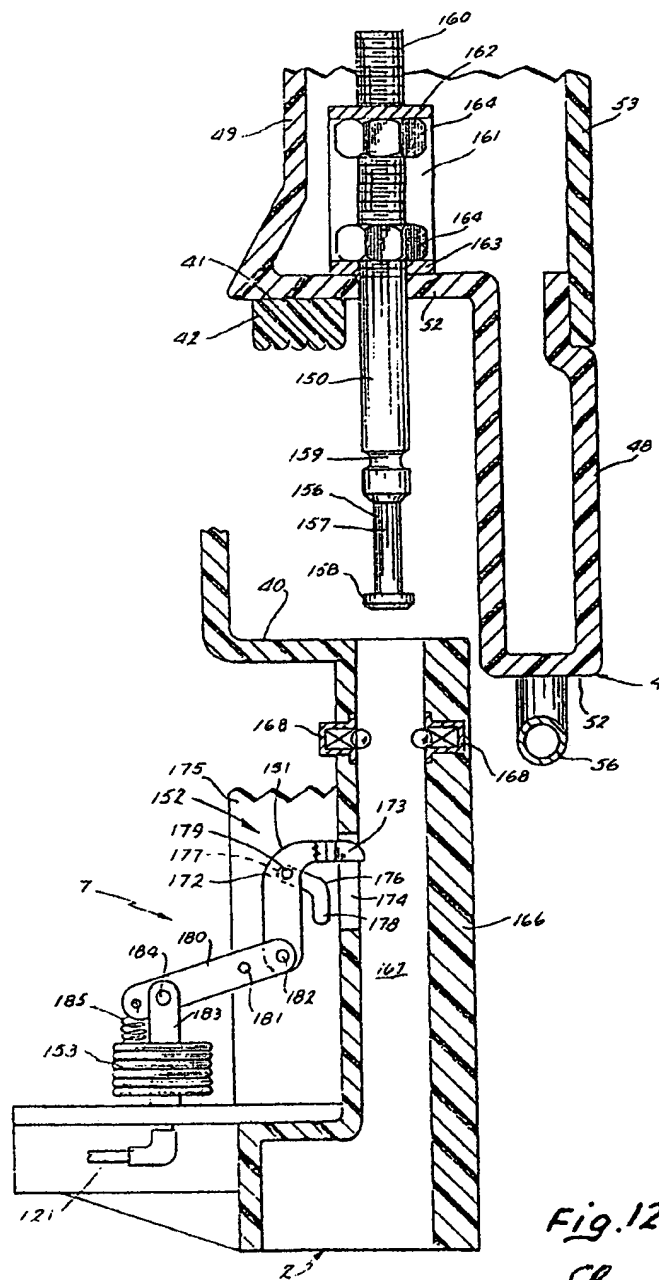
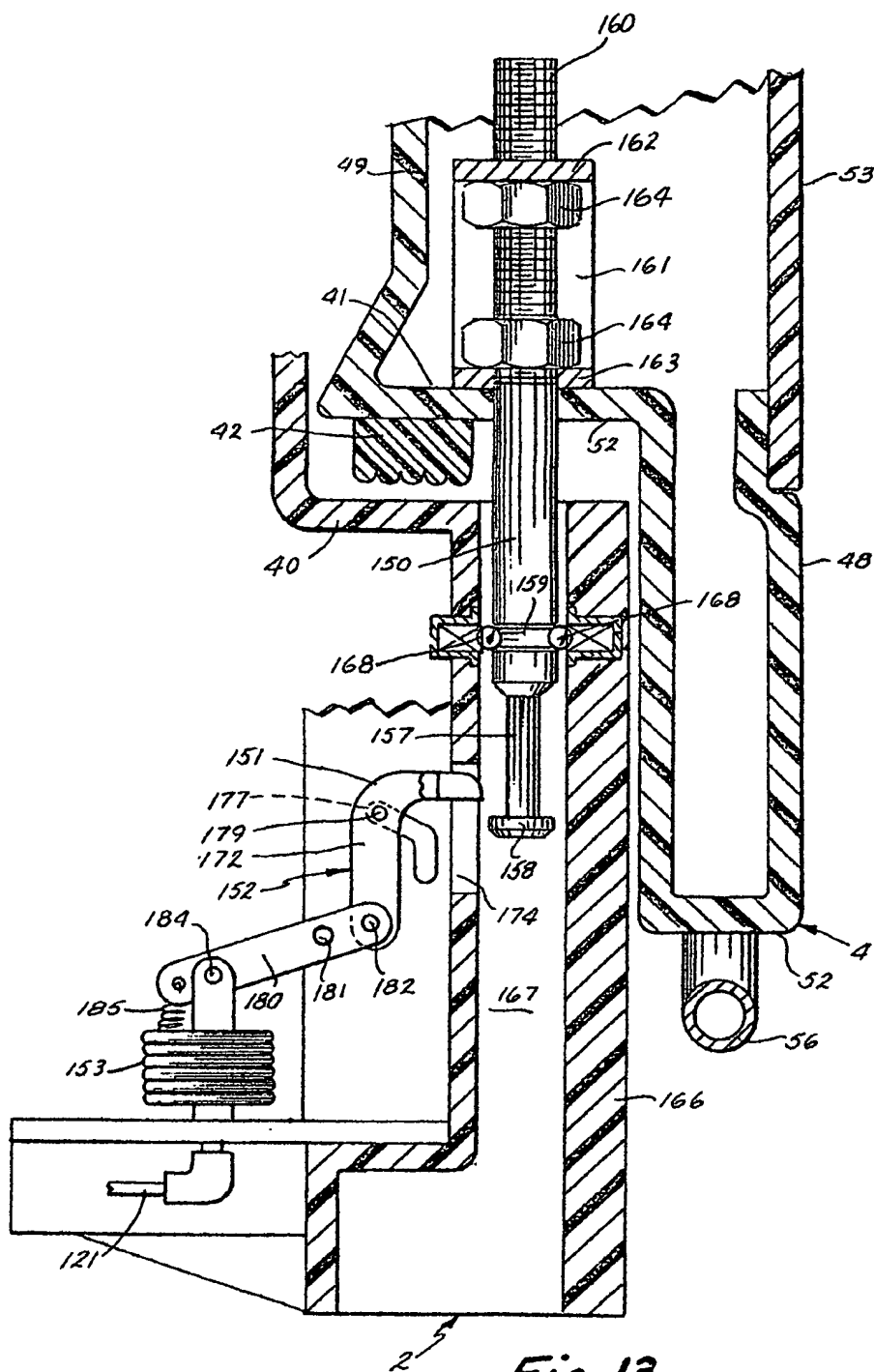
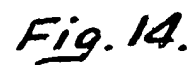


Fig. 12.

Scott &amp; Lylen



Scott & Lyban



Scott & Lydon

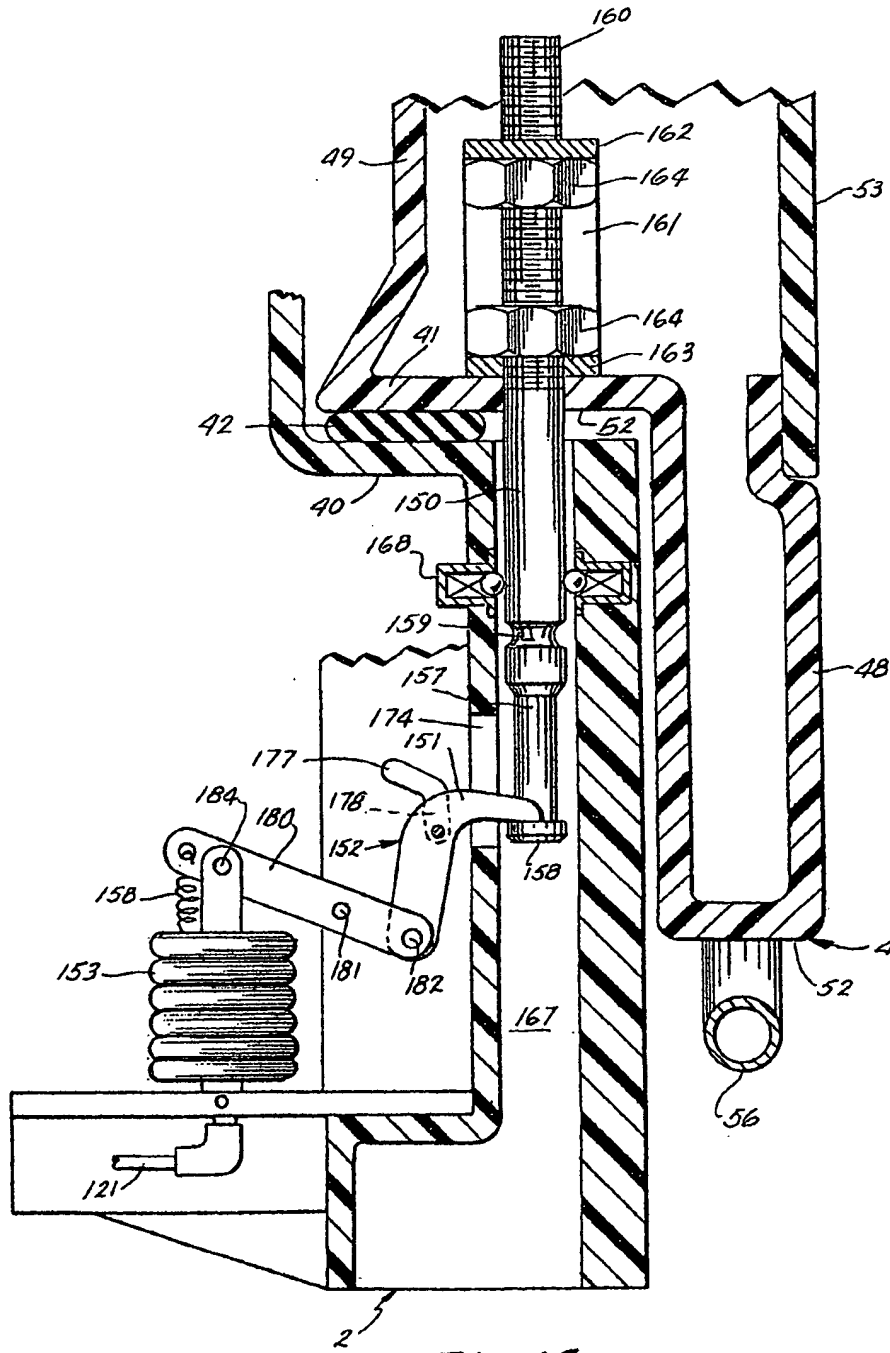


Fig. 15.

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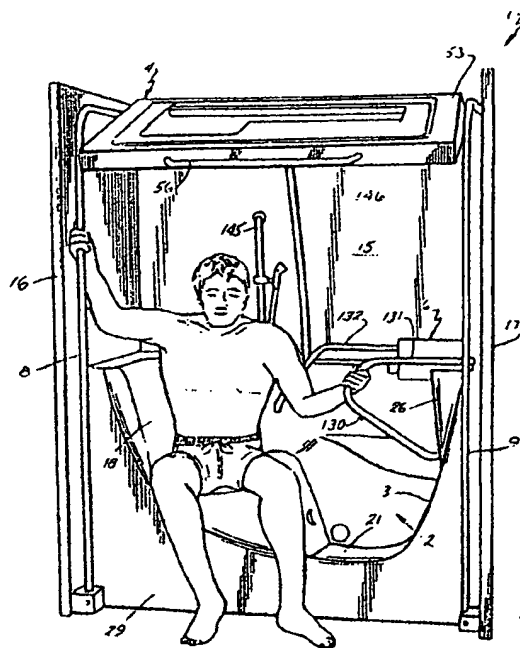


Fig. 16.

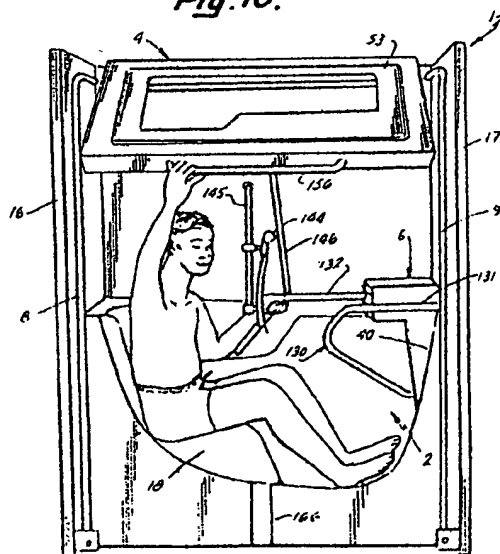


Fig. 17.

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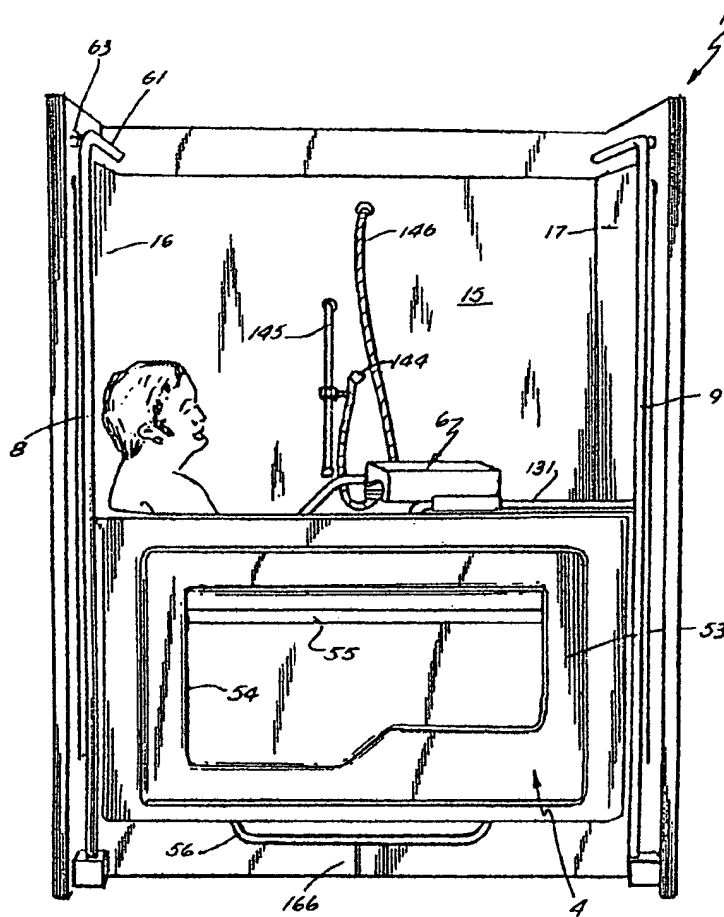


Fig. 18.

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